

Species

Fungal disease complex in endangered species *Indopiptadenia Oudhensis* from Shrawasti (U.P.) India

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ABSTRACT

This paper describes and illustrates *Pestalotiopsis oudhensis* sp. nov. and *Domingoella indopiptadiana* as new to Indian mycoflora.

Keywords: Foliicolous fungi, *Pestalotiopsis*, Domingoella, Endangered species, Uttar Pradesh.

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1. INTRODUCTION

The leaves provide a very suitable habitat for the growth & development of fungal pathogen by providing ample surface area and nutrient supply. Such leaf inhabiting fungi are known as Foliicolous and the invaded area of the leaf appears as leaf spot or leaf lesion. Taxonomic studies of such fungal forms have been generally considered as only of academic interest but the taxonomic treatment of a fungal organism in the first requirement for any studies concerning its biology. Correct identification of a fungus absolutely free from ambiguities is vital for its employment in applied disciplines. In fact without being equipped for ascertaining the correct identity of a fungal pathogen all studies concerning its phyto pathological aspects would be misleading. The weed and forest plants serve as reservoirs of leaf spot pathogens which on getting opportunity may spread to agriculture and horticulture plants.

India is the one of the twelve mega biodiversity countries of the world, has two of the worlds eighteen biodiversity hot spot located in the Western Ghats and in the Eastern Himalayas. In North of North Tarai Forests, the Himalayas rise as a virtual wall beyond the snow line. Above the alluvial plain lies the Tarai strip, a seasonally marshy zone of sand and clay soils. The Tarai has higher rainfall than the plains, and the downward-rushing rivers of the Himalayas slow down and spread out in the flatter Tarai zone depositing fertile silt and reproductive means during the monsoon season and receding in the dry season. The Tarai, as a result has high water level and is characterized by moist sub tropical conditions and a luxuriant turnover of green vegetation all the year around. The climatological and topographical conditions favor the luxuriant growth and development of foliar fungi. This North Tarai region of U.P. is next only to Eastern and Western Ghats, as one of the hottest spots for biodiversity in general and the diversity of fungal organism inhabiting plant leaves in particular offers

an ideal opportunity for the morpho taxonomic exploration of fungal organism in general and foliicolous fungi in particular. Keeping this in view the authors surveyed the North Central Tarai Forests of Uttar Pradesh during April 2012 to April 2013.

2. SCOPE OF STUDY

The Foliicolous Fungi causes huge losses every year in different parts of the world. The fungal pathogens producing leaf spots infect a large variety of hosts including most of the crops, forests and other plants. The destruction caused by these enemies of leaves is a serious problem before us. The focus of this research is identification & documentation of foliicolous fungi which will assist in the discovery of new fungicides and ideas to overcome from the severity of these enemies of nature as well as in the protection of floral diversity from the infection of these pathogens and also in the conservation of valuable flora of the area.

3. MATERIALS AND METHODS

During collection, infected leaf samples were taken in separate polythene bags. Suitable mounts of surface scrapping and hand cut sections were prepared from infected portions of the leaf samples. Slides were prepared in cotton-blue lacto phenol mixture & were examined. Camera lucida drawing were made and the morpho-taxonomic determination of taxa was done using available literature and with the help of resident's expertise available. The fungal taxa were identified using microscopic preparation.

4. RESULT AND DISCUSSION

During our survey of the North Central Tarai Forests of Uttar Pradesh for foliicolous fungi on April 01, 2013 we came across a plant, *Indopiptadenia oudhensis* (Brandis) Brenan; Hathi Paula, Genti, Gianti (Mimosaceae) a monotypic, endemic highly endangered taxa which has been

Table 1

Comparative account of morphological features of *Pestalotiopsis disseminata* and *Pestalotiopsis oudhensis*

Name of the species	Acervuli	Size of Conidia	Setulae (Apical/Basal)	Remark
<i>Pestalotiopsis disseminata</i>	Black and granular	24-28 μ m X 7-8 μ m	Apical up to 20 μ m long and Basal 5-10 μ m long	On Dead leaves
<i>Pestalotiopsis oudhensis</i>	Punctiform as well as enlarge size spot 5-10mm Amphigenous	19-23 μ m X 9-12 μ m	Apical 3-6, 10-15 μ m long and Basal 2-5, 4-20 μ m long	On living leaves

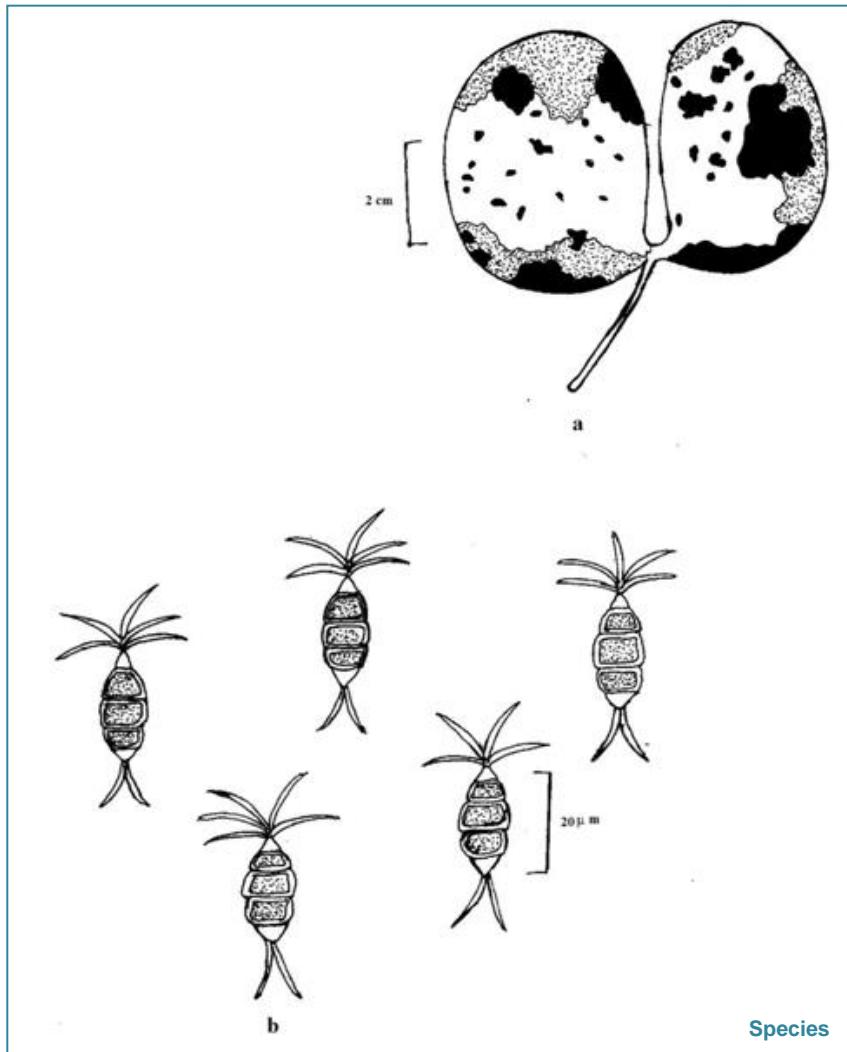


Figure 1

Pestalotiopsis oudhensis sp. nov.

- a. Infected leaf
- b. Conidia

declared threatened by U.P. Biodiversity Board, in the premises of Gulra Rest House of Bhinga Forest Range in Shrawasti Forest Division, Shrawasti. The plant was developed in a number of saplings at the rest house so as to conserve. All the plants could not survive due to one reason or the other but a single plant is found to be surviving. The whole plant was found to be severely infected. In addition to nearby forest vegetation in north side of the planted plant was agriculture wheat crop of native persons. On request the watchman provided us some leaves for our purpose. There are three types of symptoms, one is green spots like mildew in upper part some separate and some mixed with second dark brown patches. These patches are very small tiny spot to large one. The third type of symptoms are small to large, few having shot hole where as few are intact with circles inside spot. On critical study the living leaves were found to be infected with Coelomycetes fungi belonging to genus *Pestalotiopsis* Steyaert and a hyphomycetes fungus *Domingoella* sp. Sarbhoy and Saikia. On critical

examination and comparison with other known species, *Pestalotiopsis* was found to be a new species. Hence it is described as *Pestalotiopsis oudhensis* Mall and Kumar sp. nov. *Domingoella* has been found to be reported on dead twigs *Caesipenia pulchirima* from Golaghat Assam (Saikia and Sarbhoy, 1980). Since this fungus has a distinct identity and no species of *Domingoella* has ever been described on *Indopiptadenia oudhensis*. The present collections, therefore, merits description as a new species- *Domingoella indopiptadiana* Mall and Kumar sp. nov. The holotype specimen has been submitted in National Fungal Culture Collection of India (WDCM932), Agharkar Research Institute, Pune, India for allotment of accession number.

4.1. *Pestalotiopsis oudhensis* Mall and Kumar sp. nov.

Acervuli punctiform as well as larger in size 5mm-10mm/15mm amphigenous dark brown to black oozing spore mosses. Conidia 19-23 μ m X 9-12 μ m, 4 septate smooth with mid to dark brown median cells rather pale olivaceous brown, end cells hyaline, with apical setulae 3-6, 10-15 μ m long, basal setulae 2-5, 4-20 μ m long (Figure 1a, b). On living leaves of *Indopiptadenia oudhensis* (Brandis) Brenan (Mimosaceae). April 01, 2013, Bhinga Forest Range, Shrawasti; leg. Ajay Kumar, BRH-03651, AK-0151 (Isotype), AMH (Holotype). The present fungus is closer to *Pestalotiopsis disseminata* (Thum) Stey. (Singh, 1976) described on *Albizia odoratissima* (Mimosaceae) but to justify a comparative account of morphological features of *Pestalotiopsis disseminata* and *Pestalotiopsis oudhensis* is given in Table 1. Since this fungus is not conspecific with any species of *Pestalotiopsis* hitherto describe on Mimosaceae, its description as new species is thought worthwhile. The specific epithet of *Pestalotiopsis oudhensis* is based on the host name.

4.2. *Domingoella indopiptadiana* Mall and Kumar sp. nov.

Colonies effuse, dark brown, hairy rather inconspicuous. Mycelium mostly superficial. Conidiophores simple, solitary, erect with up to 2, septa. 55-110 X 2-2.5 μ m, swollen base up to 8 μ m wide, lower part brown and smooth, upper part pale brown and irregularly echinulate, with up to 3 terminal proliferation. Conidia spherical 10-12 μ m diam. Dark brown thick walled smooth with small protuberant scar (Figure 2 a,b,c). On living leaves of *Indopiptadenia oudhensis* (Brandis) Brenan (Mimosaceae). April 01, 2013, Bhinga Forest Range, Shrawasti; leg. Ajay Kumar, BRH-03651, AK-0151 (Isotype), AMH (Holotype). Since this fungus is not found to be reported on living leaves of either *Indopiptadenia oudhensis* or member of Mimosaceae. Its description as a new species is worthwhile. The specific epithet of *Domingoella indopiptadiana* is based on host name. Review of literature Bilgrami et al., (1979, 1981, 1991); Ellis, (1971, 1976); Ellis and Ellis, (1995); Jamaluddin et al., (2004); Mukerji and Juneja, (1974); Sarbhoy et al., (1986, 1996) and Verma et al., (2008) reveals that there is no record of species *Pestalotiopsis oudhensis* and *Domingoella indopiptadiana* of this type on the host family. Therefore, it is described and illustrated as a new species to accommodate it.

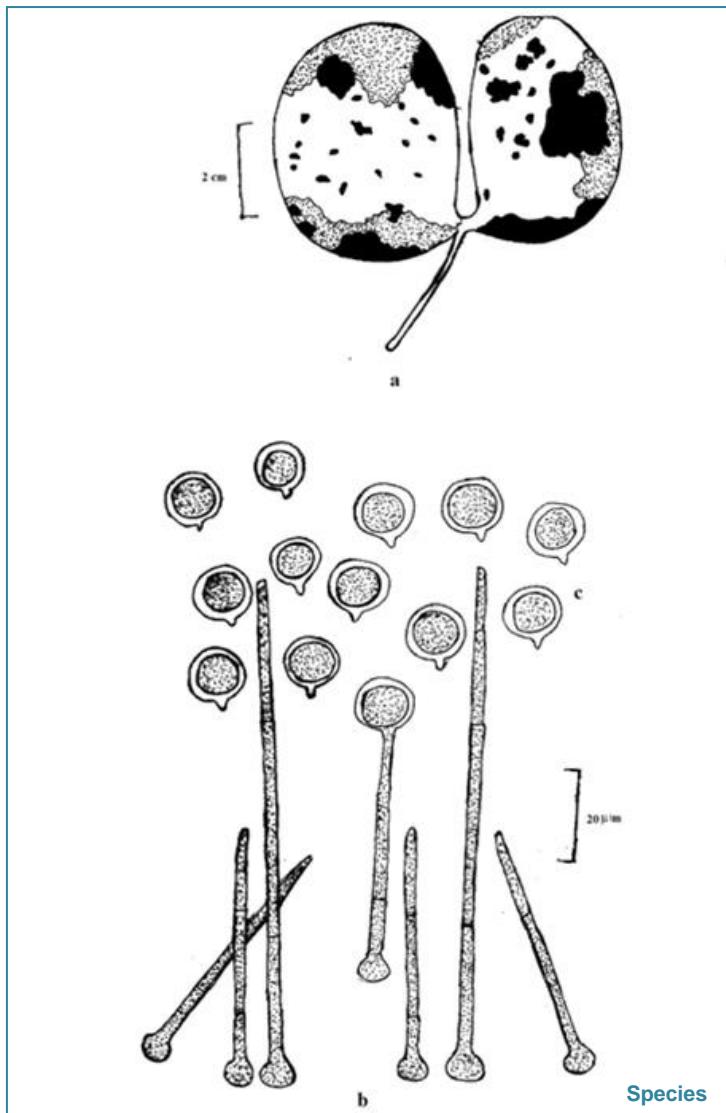


Figure 2

Domingoella indopiptadiana sp. nov.

- a. Infected leaf,
- b. Conidiophores,
- c. Conidia

RELATED RESOURCES

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5. CONCLUSION

The region of Shrawasti U. P.) is rich in phytodiversity in general as well as the diversity of fungal organisms inhabiting plant leaves in particular and it provides great scope for study of foliicolous fungi. Correct identity of a fungus absolutely free from ambiguities is vital for its employment in applied disciplines in general and it is more so for plant pathology where precision of details about the biology of the pathogen is primarily conditioned by its identity. In fact, without being equipped for ascertaining the correct identity of a fungal pathogen all studies concerning its phytopathological aspects would simply be misleading. However the end is still not insight and further investigation is warranted.

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